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| APPLICATION NO.         | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-------------------------|-------------|----------------------|---------------------|------------------|
| 10/743,264              | 12/23/2003  | Bill H. Quon         | 071469-0306171      | 4467             |
| 909                     | 7590        | 02/24/2005           | EXAMINER            |                  |
| PILLSBURY WINTHROP, LLP |             |                      | ALEMU, EPHREM       |                  |
| P.O. BOX 10500          |             |                      | ART UNIT            |                  |
| MCLEAN, VA 22102        |             |                      | PAPER NUMBER        |                  |
|                         |             |                      | 2821                |                  |

DATE MAILED: 02/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/743,264

Applicant(s)

QUON ET AL.

Examiner

Ephrem Alemu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 11 is/are rejected.
- 7) ☒ Claim(s) 8-10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                                                             |                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                                                 | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                                                        | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>12-23-03 &amp; 4-15-04</u> . | 6) <input type="checkbox"/> Other: _____                                                |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statement filed 4-15-04 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because it lacks a list of all patents, publications, applications, or other information submitted for consideration by the Office. However, the examiner as discussed in this office action has considered the list of references listed in the appendix of the information disclosure statement filed 4-15-04.

### ***Claim Rejections - 35 USC § 102***

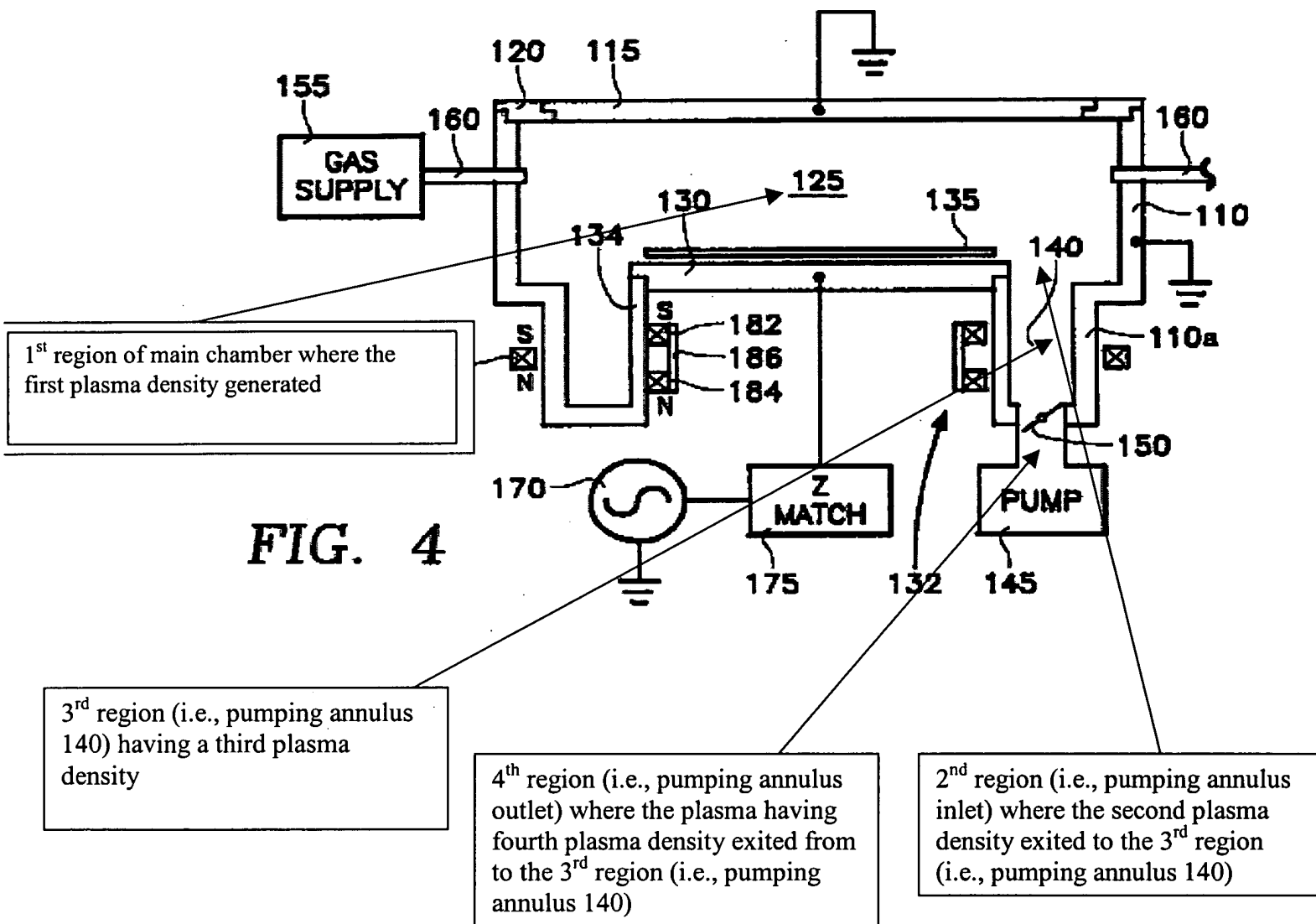
2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-4 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Quiles et al. (US 6,562,189).

Re claims 1 and 11, Quiles discloses a plasma processing system as illustrated in Fig. 4 below.



The plasma processing system (i.e., plasma reactor) comprising:

a plasma processing device (i.e., vacuum chamber comprised of sidewall 110) having a first plasma density (i.e., first region of main chamber where the first plasma having first density being generated) proximate a processing region (i.e., first region 125) and a second plasma density proximate an exit region (i.e., pumping annulus inlet where the second plasma density

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exited to the 3<sup>rd</sup> region (i.e., pumping annulus 140), since the exit region (i.e., pumping annulus inlet) has smaller surface area (volume) than the 1<sup>st</sup> region then plasma has lower density);

an inter-stage plasma (ISP) source (i.e., pumping annulus 140) fluidly coupled to the plasma processing device (i.e., vacuum chamber comprised of sidewall 110) proximate the exit region (i.e., pumping annulus inlet), the ISP source (i.e., pumping annulus 140) comprising an inter-stage plasma region having a third plasma density (i.e., pump annulus 140 has a third region between the exit region and vacuum pump 145 which has more surface area (volume) that has more dense plasma) (Fig. 4); and

a plasma pump (i.e., vacuum pump 145) fluidly coupled to the ISP (i.e., pumping annulus 140), the plasma pump (i.e., vacuum pump 145) having a fourth plasma density (i.e., the pump inlet has smaller area than the other region will have smaller amount of plasma, therefore the plasma density is much more smaller than the other regions) system wherein pumping speed (i.e., gas flow rate) is dependent upon the third plasma density (i.e., by effectively confining plasma in the pump annulus 140) and the fourth plasma density in order to achieve the requisite gas flow rate (Figs. 1-4; Col. 4, lines 46-67; Col. 5, lines 5-19; Col. 6, lines 33-66).

Re claim 2, since the first plasma density (i.e., first region of main chamber where the first plasma having first density being generated proximate the processing region (i.e., first region 125) have a larger surface area than the second plasma density proximate the exit region (i.e., pumping annulus inlet where the second plasma density exited to the 3<sup>rd</sup> region (i.e., pumping annulus 140)), the second plasma density is lower than the first plasma density (i.e., first region of main chamber where the first plasma having first density being generated

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proximate the processing region (i.e., first region 125) (Figs. 1-4; Col. 4, lines 46-67; Col. 5, lines 5-19; Col. 6, lines 33-66).

Re claims 3 and 4, the third plasma density (i.e., pump annulus 140 having the third region between the exit region and vacuum pump 145 which has more surface area (volume) that has more dense plasma) is greater than the second plasma density proximate the exit region (i.e., pumping annulus inlet where the second plasma density exited to the 3<sup>rd</sup> region (i.e., pumping annulus 140) and the fourth plasma density proximate the vacuum pump in order to achieve the requisite gas flow rate by effectively confining plasma in the third region (i.e., pump annulus 140) (Figs. 1-4; Col. 4, lines 46-67; Col. 5, lines 5-19; Col. 6, lines 33-66).

4. Claims 1-7 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Quon et al. (US Pub. 2004/0151595).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Re claims 1 and 11, Quon discloses a plasma processing system (10) comprising:  
a plasma processing device (i.e., vacuum chamber 14) having a first plasma density (i.e., plasma 13) proximate a processing region (i.e., first region 11)) and a second plasma density proximate an exit region (i.e., at the inlet end 21 of conduit 19) (Figs. 1, 2; Page 2, paragraphs [0024], [0025], [0033]);

an inter-stage plasma (ISP) source (i.e., conduit 19) fluidly coupled to the plasma processing device (i.e., vacuum chamber 14) proximate the exit region (i.e., at the inlet end 21 of conduit 19), the ISP source (i.e., conduit 19) comprising an inter-stage plasma region having a third plasma density (i.e., plasma 15) (Figs. 1, 2; Page 2, paragraphs [0025], [0030], [0033]; Page 3, paragraph [0034]); and

a plasma pump (i.e., system pump 25) fluidly coupled to the ISP, the plasma pump having a fourth plasma density (i.e., the plasma exiting conduit 19 to the system pump 25), wherein pumping speed is dependent upon the third plasma density (i.e., plasma 15) and the fourth plasma density (i.e., the plasma exiting conduit 19 to the system pump 25) (Figs. 1, 2; Page 5, paragraph [0044]).

Re claim 2, the first plasma density is greater than the second plasma density since the first plasma density (i.e., plasma 13) proximate the processing region (i.e., first region 11) have a larger surface area than the second plasma density proximate exit region (i.e., at the inlet end 21 of conduit 19) (Figs. 1-2).

Re claims 3 and 4, the third plasma density (i.e., plasma 15) is greater than the second plasma density proximate an exit region (i.e., at the inlet end 21 of conduit 19) or the fourth plasma density (i.e., the plasma exiting conduit 19 to the system pump 25) in order to provide improved pumping performance for a process plasma with low plasma density (Figs. 1-2; Page 3, paragraph [0034]).

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Re claims 5 and 6, Quon discloses the ISP (i.e., conduit 19) comprises an inductively coupled plasma (ICP) source or a capacitively coupled plasma (CCP) source (Figs. 1-2; page 2, paragraph [0030], page 3, paragraph [0034], page 5, paragraph [0065]).

Re claim 7, Quon discloses the ISP (i.e., conduit 19) comprises a ring-shaped channel (page 3, paragraph [0041] - page 5, paragraph [0057]).

***Allowable Subject Matter***

5. Claims 8-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record fail to teach or suggest, alone or in combination the limitation: “wherein the ISP comprises a plurality of cylindrical channels arranged in a ring pattern” as claimed in claim 8.

Claims 9 and 10 are indicated as allowable as being dependent over objected claim 8.

***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Quon (US Pub. 2003/0150562); Carducci et al. (US 6,773,544) ; Li et al. (US 6,168,726); and Loewenhardt et al. (US 6,030,486); also teach similar inventive subject matter.

***Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ephrem Alemu whose telephone number is (571) 272-1818. The examiner can normally be reached on M-F Flex hours.

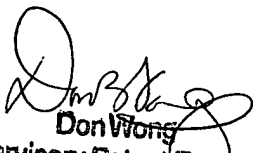


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don K Wong can be reached on (571) 272-1834. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

EA  
2-19-05

  
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